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ABSTRACT

A school construction guide offers key personnel in school development projects information on the complex task of master planning and construction of schools in Australia. This chapter of the guide provides advice on site selection covering selection criteria; traffic issues; and site services, such as water, power, and sewer. Additionally discussed are tips on state government planning proposals; environmental considerations, such as flooding control, landscaping, site drainage and erosion control; safety; public and private transport needs; recreational facilities; and other site facilities and services, such as roads and paths, sewage disposal, and communication systems for support staff. (GR)

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School Buildings

Planning, Design and Construction

John H Odell FRAIA ASITC
in association with the
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MAKING THE MOST OF YOUR SCHOOL SITE 2

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School Buildings, Planning Design and Construction is presented in a ring binder with 8 booklets. The document is available only as a complete set

1	Introduction and Chapter 1 – Developing a Master Plan
2	Chapter 2 – Making the Most of Your School Site
3	Chapter 3 – Principles of Good School Building Design
4	Chapter 4 – Purpose Designed Facilities
5	Chapter 5 – Construction Methods and Materials
6	Chapter 6 – Managing the Construction Process
7	Chapters 7 and 8 – Technology and Managing Buildings
8	Appendices

ISBN 0 646 23758 6 refers to the complete set of 8 booklets

Author - John H Odell FRAIA ASTC
Epping NSW, Australia

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School Buildings - Planning, Design and Construction

A Guide Document

for School Councils, Boards and Committees, School Principals and Staff and Construction Professionals

Author - John H Odell FRAIA ASTC

Introduction to

School Buildings – Planning, Design and Construction

Good school buildings do not just happen. Thought and consideration must be given to the needs of the users of the building and to the available resources. The persons responsible for building the school should have considerable experience or draw on the advice of those who have.

For a building to be satisfying and successful it must provide shelter, have durable construction and finishes, be aesthetically pleasing and appropriate to its use. A well-planned school will incorporate the following points:

- buildings and grounds will satisfy and support both short and long-term requirements
- curriculum demands including requirements for registration by authorities will be met
- site development will not be haphazard and each project will pave the way for the next
- building design will be flexible to cater for as yet unknown future requirements
- building will be cost effective - and in the long term the school will avoid unnecessary expensive recovery action
- good building design will encourage a high quality educational environment
- pre-planning of maintenance requirements will assist in reducing operating costs

Contents of Booklet 2

2. Making the Most of the School Site

2.1. Site Selection..p 23

2.1.1. Selected Safety Factors..p 24

2.1.2. Environmental factors..p 25

2.1.3. Location factors..p 25

2.1.4. Soils..p 25

2.1.5. Topography..p 25

2.1.6. Size and shape..p 25

2.1.7. Accessibility..p 26

2.1.8. Commonwealth Government Guidelines to site size..p 26

2.2. Local authorities/municipal utilities..p 26

2.2.1. Zoning controls - need for consultation with local authorities..p 27

2.2.2. The Environment and Protection Orders..p 27

2.2.3. Service suppliers..p 27

2.2.4. State Government Planning proposals..p 28

2.2.5. Demountables policy..p 28

2.3. Environmental Considerations..p 29

2.3.1. Selecting sites with respect to sun, wind and rain..p 29

2.3.2. Site Drainage..p 29

2.3.3. Erosion control..p 29

2.3.4. Potential for modifying contours..p 32

2.3.5. Landscaping potential - vegetation..p 33

2.3.6. Limited Sites..p 33

2.4. Transport considerations..p 34

2.4.1. Safety Aspects..p 34

2.4.2. Public Transport..p 34

2.4.3. Private transport – parking and driver training areas..p 35

2.4.4. Service transport vehicles..p 37

2.5. Recreation facilities..p 37

2.5.1. Passive recreation..p 38

2.5.2. Active Recreation..p 38

2.5.3. After hours use..p 38

2.6. Site facilities and services..p 38

2.6.1. Paths and roads..p 38

2.6.2. Site Services..p 39

2.6.3. Fire control..p 40

This guide is designed to assist key personnel in school development projects with the complex task of master planning and construction of schools.

Individual chapters in this guide may be distributed to relevant key personnel as appropriate to their specific interest and responsibility.

Each chapter is a separate booklet with chapters 7 and 8 bound together in one booklet and chapter 9 in booklet 8.

The chapters:

1 Developing a Master Plan for Your School

2 Making the Most of Your School Site

3 Principles of Good School Building Design

4 Purpose Designed Facilities

5 Construction Methods and Materials

6 Managing the Construction Process

7 Technology and Educational Buildings

8 Managing School Buildings

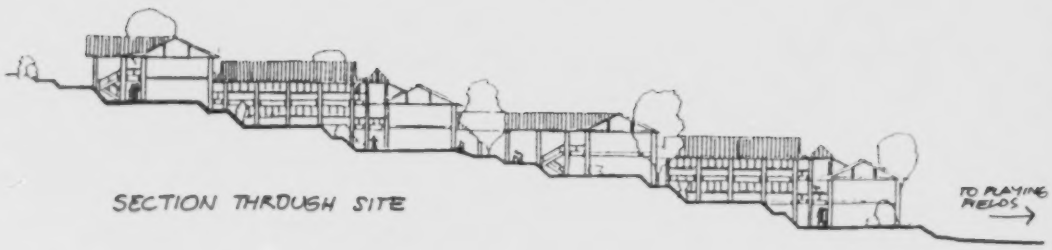
9 Appendices

This Guide aims to:

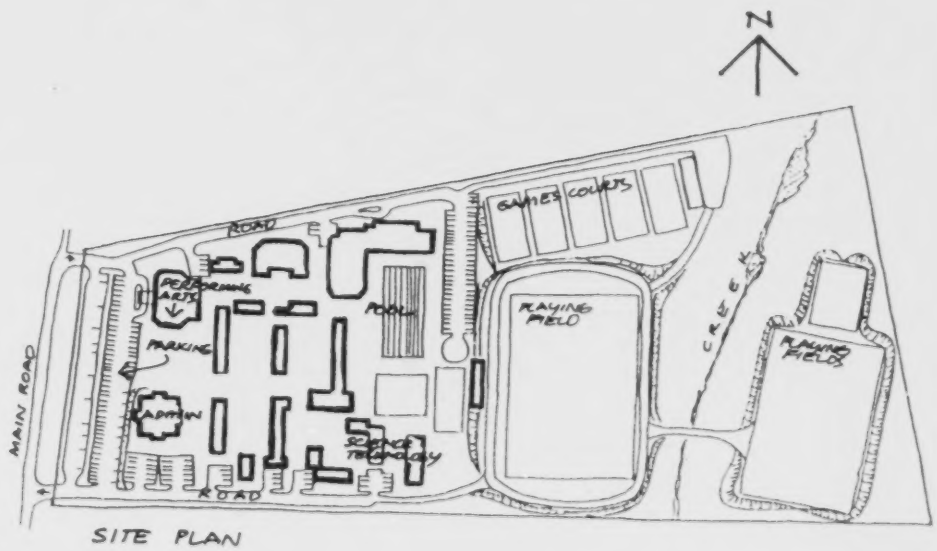
- demonstrate the necessity for school communities to produce comprehensive master plans for the development of their school
- encourage school staff and boards to be involved in the development of school facilities and to draw on the wider experience of the community during that process
- outline planning processes and techniques that will lead to greater creativity in school design with greater efficiencies and productivity in the construction process
- help school staff and board members in their dealings with professionals in the building industry, and vice versa
- encourage excellence in school facilities
- maximise potential of limited resources to achieve desirable outcomes
- provide advice on how to determine whether a particular facility is vital to a school
- provide examples of excellence in school building and planning
- provide a comprehensive list of contacts, resources and references.

Who should read this Guide:

- All school council/board members
- Principals, bursars and other key staff members
- All members of school building and planning committees
- Administrators in control of school building projects
- Construction industry professionals, especially school architects



SECTION THROUGH SITE



SITE PLAN

MAKING THE MOST OF A STEEP SITE

Lindisfarne Anglican Secondary School, Terranora, NSW is a very new school.
The first stage is due for completion in 1995.
The site is steep falling to a flat area at the rear of the site which will be used for playing fields.
The buildings will be constructed on level platforms formed by cutting and filling the site. They will mostly be multi-level buildings built along the contours with external stairs linking the various levels.
Roads on either side of the site allow access for construction vehicles without impeding pedestrian traffic within the site during school hours - a critical aspect for schools in the growth phase.

Architect - Brown Burling and Partners Pty Ltd

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2

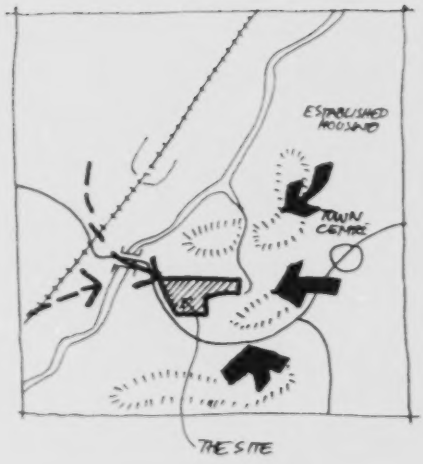
Making the Most of the School Site

2. Making the Most of the School Site

The School Site, Engineering Services and Traffic Issues

This chapter is intended to assist schools in choosing a site, and covers site selection criteria, traffic issues and site services such as water, power and sewer.

- Site Selection (refer 2.1)
- Local Governmental Regulations (refer 2.2)
- Environmental Considerations (refer 2.3)
- Transport and Traffic (refer 2.4)
- Recreation Facilities (refer 2.5)
- Site Facilities (refer 2.6)


ESTABLISHED HOUSING
TOWN CENTRE
THE SITE
INITIAL NEW ENROLMENTS
INITIAL ENROLMENTS
BEFORE SELECTING A SITE & STARTING ON A MASTER PLAN MAKE A COMPREHENSIVE ANALYSIS OF THE POTENTIAL CATCHMENT AREA.

2.1. Site Selection

There are many aspects which need to be taken into account in the selection of a suitable site for a school. It would be rare for all criteria to have been met when the final selection is made. For this reason, it is important to establish a basis for ranking the various criteria prior to the decision process, so that the most important needs are met.

> *....planning for the best use of the site can be as critical as the planning of the buildings....*

The California Department of Education has established a School Site Selection and Approval Guide which may be a useful reference tool in your ranking process. A screening, ranking and evaluation procedures guide is incorporated and has been reproduced in Appendix 9.4. The following major site selection criteria are discussed below:

- Safety (refer 2.1.1)

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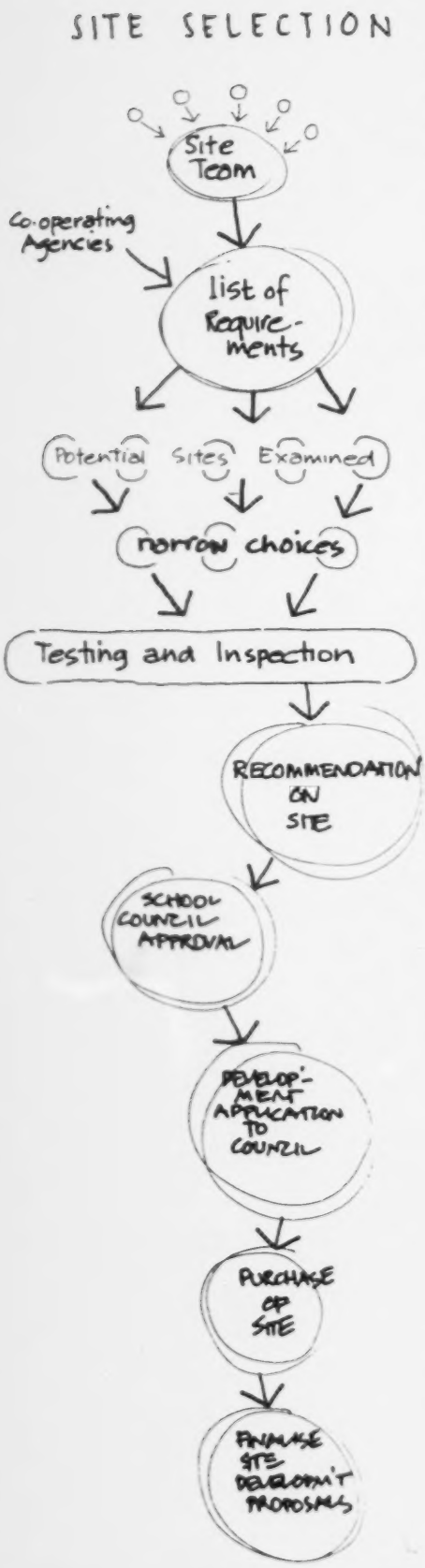

- Environment (refer 2.1.2)
- Location (refer 2.1.3)
- Soils (refer 2.1.4)
- Topography (refer 2.1.5)
- Size and Shape (refer 2.1.6)
- Accessibility (refer 2.1.7)

2.1.1. Selected Safety Factors

Safety pertains not only to risk of accident but also to health issues such as exposure to electromagnetic radiation, chemicals, dust and pollen. Some of the main safety issues are described below:

Proximity to High Voltage Power lines

While the research regarding the effects of electromagnetic fields on humans is increasing, the results so far have been inconclusive. Nevertheless caution is warranted and a conservative approach is generally advised.

The School Facilities Planning Division of the California Department of Education has developed the following guideline:

a. 30m from edge of easement for 100-110 kV line

b. 45m from edge of easement for a 220-230 kV line

c 75m from edge of easement for a 345 kV line.

The widths of easements will vary from one administration to another - the above information is provided as a rough guide.

Another potential hazard is the electromagnetic fields from high tension cables. Both in Australia and overseas, the permitted levels of electromagnetic fields are being reduced. Confirm if possible current standards as to permitted levels of electromagnetic radiation measured in milli gausse.

Hazardous or toxic substances

Sites with potential exposure to hazardous substances should be avoided:

- Landfill sites where hazardous substances may have been buried
- Sites downwind of stockpiles of fertiliser, soil processing or sewage treatment facility
- Sites in proximity to uncontrolled, pollen producing plants and shrubs

Other safety factors

Sites in areas of potential danger to students should be avoided:

- adjacent to highways, airports or heliports
- subject to flooding
- near areas with high incidences of crime or alcohol and/or drug abuse

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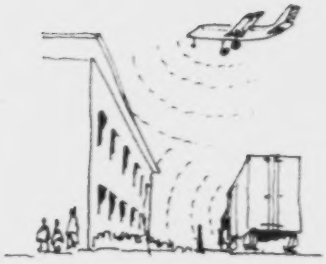
2.1.2. Environmental factors

Consider environmental factors, such as noise and air pollution:

- noise sources, such as highways or flight paths where there is no sound buffer, may impede the instructional process
- air pollution, smoke, dust, odours

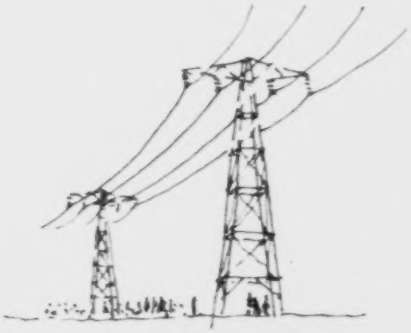


NOISE FACTORS

2.1.3. Location factors

Consider location factors such as convenience for students, proximity to student resources, and zoning:

- reasonable proximity to homes of students (the drawing area)– within half an hour for junior grades and one hour for secondary students
- compatibility with current and future zoning regulations
- proximity to public services such as libraries, parks and museums
- favourable orientation to wind and natural light



ELECTROMAGNETIC RADIATION

2.1.4. Soils

Geological surveys should be carried out to assist in assessing possible sites.

- Avoid fault lines
- Check stability of soil and bearing capacity
- Water-table, with the potential for soil liquefaction if potential exists with soil type

2.1.5. Topography

Topography is the shape and texture of the surface of the ground. A careful analysis will help to avoid the following problems:

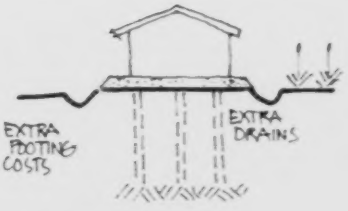
- surface and sub-surface drainage
- rock ledges and outcrops, which may be an attractive feature, but also an indication of foundation problems
- Steep grades which would impede convenient access, particularly for less physically able students

GOOD BEARING

2.1.6. Size and shape

Sites appropriate in size and shape should be chosen:

- area should be consistent with Commonwealth guidelines - refer 2.1.8
- consider appropriate length-to-width ratio (long, narrow sites make planning difficult, particularly if major axis is north-south)
- ensure there is a convenient, large, open space for playing fields
- allow for potential for expansion of buildings and/or site



POOR BEARING

2.1.7. Accessibility

Allow for reasonable accessibility for students, parents, staff and services:

- reasonable road access for buses, for transportation to and from school
- access, parking and loading areas for cars and trucks

These matters will be dealt with in more detail below.

COMMONWEALTH GUIDELINES - SITE SIZE

a. PRIMARY SCHOOLS

- UP TO 100 STUDENTS	1.5 ha
- 100 to 200	2.4 ha
- 200 +	0.2 ha/ 100

b. SECONDARY SCHOOLS

- UP TO 100 STUDENTS	3.0 ha
- 101 TO 200	4.0 ha
- 200 +	0.4 ha/ 100

2.1.8. Commonwealth Government Guidelines to site size

These are to be found in the Commonwealth Program for Schools published each year by the Department of Employment, Education and Training.

It should be noted that these are indicative only, they are not compulsory. Many schools manage well on smaller sites, especially in the cities. (Refer information in box opposite)

2.2. Local authorities/municipal utilities

There are a several layers of government controls that regulate school developments. The first step is to make contact with the local city, municipal or shire council. If there are other bodies involved the local council will soon advise.

Local government requirements

The local council may impose requirements on schools in respect of:

- noise
- drainage
- materials
- landscape
- parking
- site cover
- distance from boundaries
- disposal of waste water (sewage)
- power cables to be underground
- road upgrades
- traffic calming, signals, roundabouts

Requirements will vary from site to site and should be checked with the local council before finalising the selection of a site.

Local government regulates zoning, water and power, demountable buildings and has its own planning proposals. School planners should liaise with local government at an early stage to ensure that the school project is coordinated with and can benefit from any local or state plans.

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2.2.1. Zoning controls - need for consultation with local authorities

Municipalities are generally divided up into zones with various allowable uses. This limits the potential of hazardous activities affecting dwellings and similar sensitive areas. Zonings refer to the allowable uses of the land within that particular zone. Two kinds of schedules usually appear: uses which are permitted and uses which are not permitted.

In the case of schools, where they are permitted this will usually be only with Development Consent of the local council. This is a formal and often lengthy procedure.

In the case of schools, a site may be specifically zoned for educational purposes. This is usually the case in respect of government schools. Zoning issues should be addressed and resolved at an early stage of planning, preferably before purchase.

2.2.2. The Environment and Protection Orders

Conservation of the environment has become a significant planning issue for any development. Relevant information is contained in the environment plans developed by the local council. Before selecting a site, planners should be aware of any protection orders and their implications.

Heritage orders

Heritage orders are legal instruments designed to protect local historic sites. They may apply to buildings, farm buildings and the land itself, which may have been used by a person of note.

Aboriginal sites

Sites deemed important to Australian Aboriginal people are likely to be already noted by community groups. They are important in Australia's heritage and need to be handled sensitively and in consultation with relevant groups and local communities.

These matters must be clarified and resolved as early as possible, and well before a site selection is made.

2.2.3. Service suppliers

Further details regarding services for school buildings and grounds can be found in sections 3.8 and 5.3. Some of the more critical aspects are found below.

Water and sewerage facilities

The applicant must usually demonstrate to the local authority that an adequate supply of potable water is available before a school building is approved. Arid regions require planners to pay particular attention to water retention for domestic use as well as for irrigation. Examine rainfall data to determine if adequate water is to be available for the needs of the school if town water is not available.

The school must also have provision for a sewerage system, such as:

- connection to a town sewer
- provision of an on-site sewage processing plant with sufficient capacity. For more detail regarding water and sewerage systems, refer to sections 3.8.2 and 5.3.2.

Light and Power

At a very early stage of site selection, the local power authority should be contacted to assess whether adequate power can be supplied. Do not assume that power cables in the street means that there is adequate power supply. Bringing new cables of adequate size to the school site can be very expensive and would be a major cost consideration in choosing a site. The school should plan for growth in power demands, as the requirement for additional electrical energy increases with each subsequent generation. For more information on light and power, refer to sections 3.8.3 and 5.3.1.

Gas service availability, piped or bottled

The presence of natural gas or coal gas services in the street can be a valuable energy resource.

The availability should be assessed. Bottled gas can also be a useful resource but it involves substantial investment in infrastructure. The feasibility should be tested over the period of the life of the school or the life of the infrastructure to determine the benefit of adding a second energy source.

2.2.4. State Government Planning proposals

State governments, at times, develop planning schemes in consultation with local councils to maximise the benefit of related infrastructure such as: community transport facility, parking areas, community halls and recreational facilities.

Prior to settling on any site the school planning team should investigate with the local council whether any planning proposals exist. The school should offer to assist and cooperate in any developments being planned as they can be of benefit to the school.

An example of cooperation between a group of schools and the local council and State Government exists in Adelaide SA in an outer suburb called Aberfoyle Park. Here four primary schools operate on one site, two state schools, one Roman Catholic school and one Uniting Church school[1]. The schools share a library, recreational facilities a hall and a Gymnasium, as well as some administration and specialised teaching; music sportand LOTE (Spanish and Mandarin).

2.2.5. Demountables policy

Some councils have resisted the use of demountables or relocatables because of the tendency of schools to require them longer than

[1] *Pilgrim School, Aberfoyle Park SA*

originally intended. The temporary appearance is considered by some councils to be detrimental to the community. Not all relocatables need to appear temporary – the construction is often equivalent in strength and durability to permanent facilities.

If a school plans to start with demountable or relocatable buildings, local planning authority policy must be ascertained at an early stage in the site selection/design process.

In NSW, for example, a number of councils do not require development approval for demountable buildings, only a building approval. Knowing this policy at an early stage, a school can avoid complications and costly delays.

2.3. Environmental Considerations

2.3.1. Selecting sites with respect to sun, wind and rain

Sites subject to extremes in weather conditions should be avoided unless the school design plan includes a way to overcome the problem.

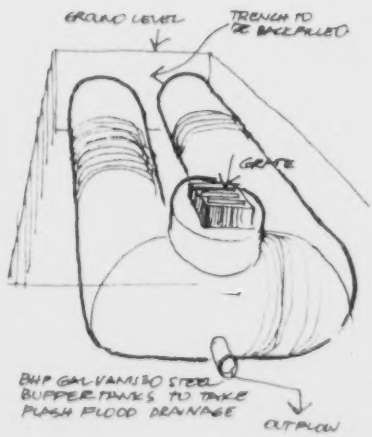
Children need shelter from rain and overexposure to cold, hot winds and sun. Shelter is best provided by natural means such as belts of trees or hills to divert winds. Shelter can also be incorporated in the design by orienting the buildings to provide external access protected from driving rain and wind.

Buildings should also be oriented to take advantage of natural light and warmth.

2.3.2. Site Drainage

Any potential school site must have the capacity to dispose efficiently of both storm and waste water.

Sites in areas of heavy or sustained rainfall need to be able to dispose of the water quickly without danger to students and without the ground becoming boggy and incapable of use.



2.3.3. Erosion control

Steep sites will require erosion control of the soil by planting. Temporary protection will also be needed using, for instance, biodegradable fabric or earth banks.

In the development phases of a site, the local council will generally require temporary "berms" or banks to contain soil freshly excavated. This is sometimes done using bales of straw pinned to the ground with steel spikes.

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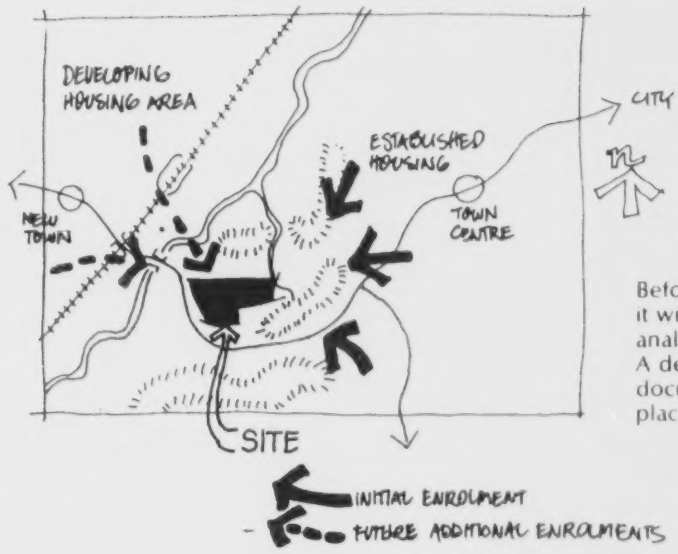
LOCATION MAP

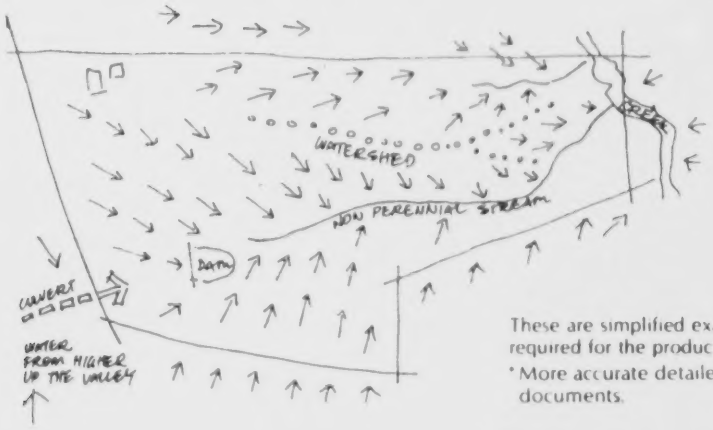


This shows the site relative to transport system and population areas both present and future.

SITE ANALYSIS

Before starting on design work or master planning it will be necessary to make a comprehensive analysis of the major features of the selected site. A detailed professional survey is necessary before documentation and accurate costing can take place.

SITE DRAINAGE PATTERNS

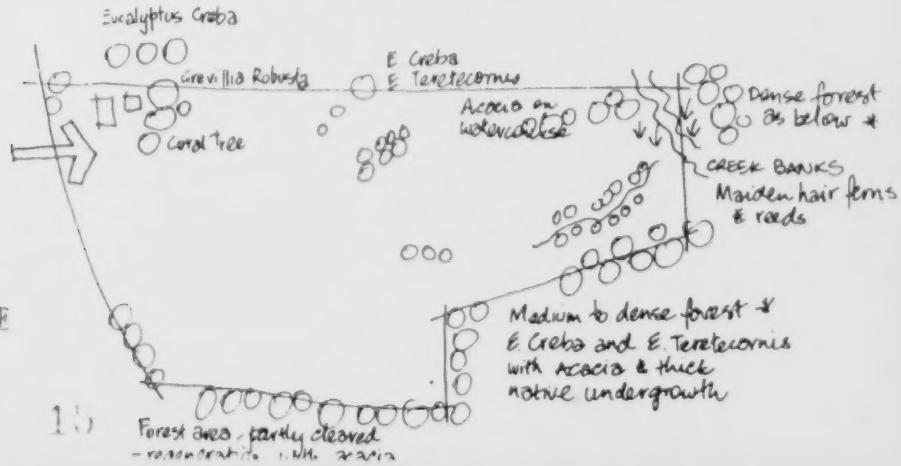


* Other data needed includes
- soil bearing capacity
- strata/faultlines etc.
- water tables
- access for services or position of easements
- road access possibilities

These are simplified examples of some of the types of drawings that are required for the production of a site master plan.

* More accurate detailed data is required for the production of working documents.

SITE VEGETATION ANALYSIS


Eucalyptus Creba
Grevillia Robusta
E. Creba
E. Tereticornis
Acacia on watercourse
Coral Tree
Dense forest as below *
CREEK BANKS
Maiden hair ferns & reeds
Medium to dense forest * E. Creba and E. Tereticornis with Acacia & thick native undergrowth
Forest area - partly cleared

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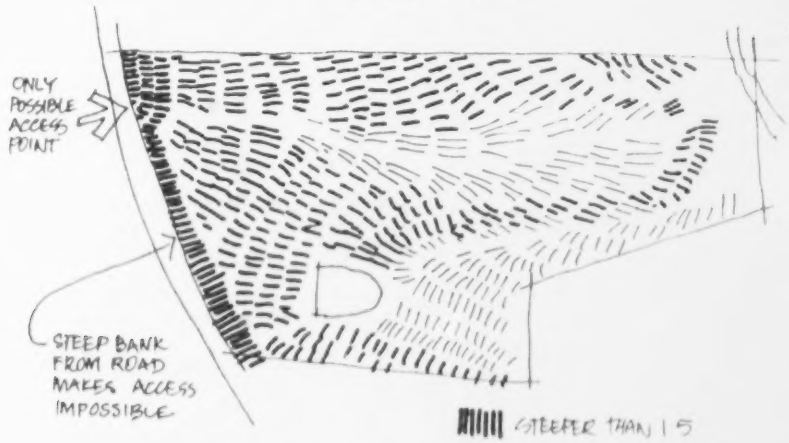
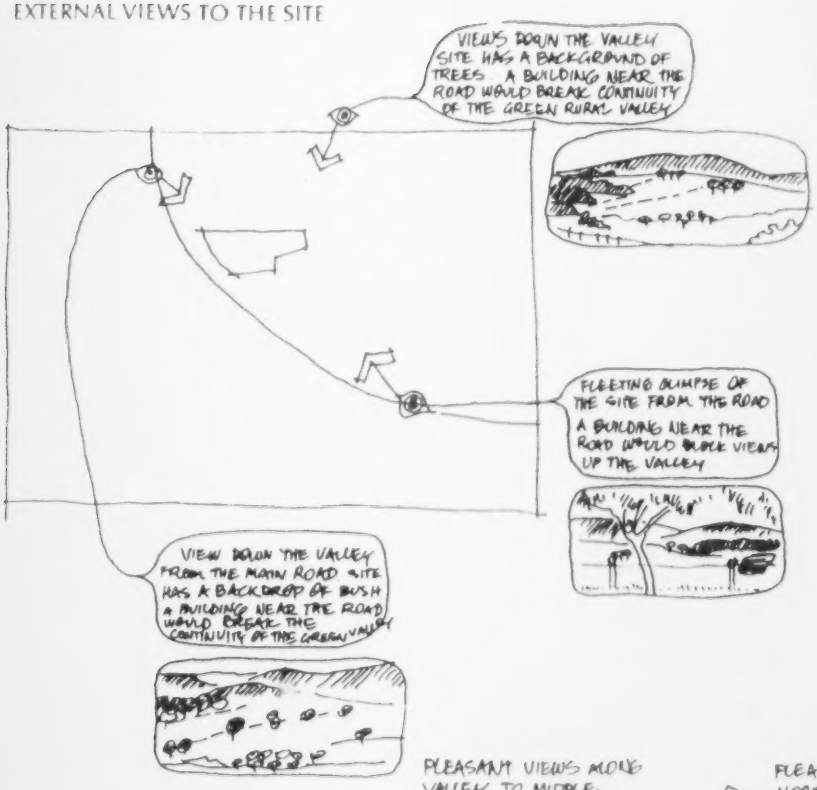
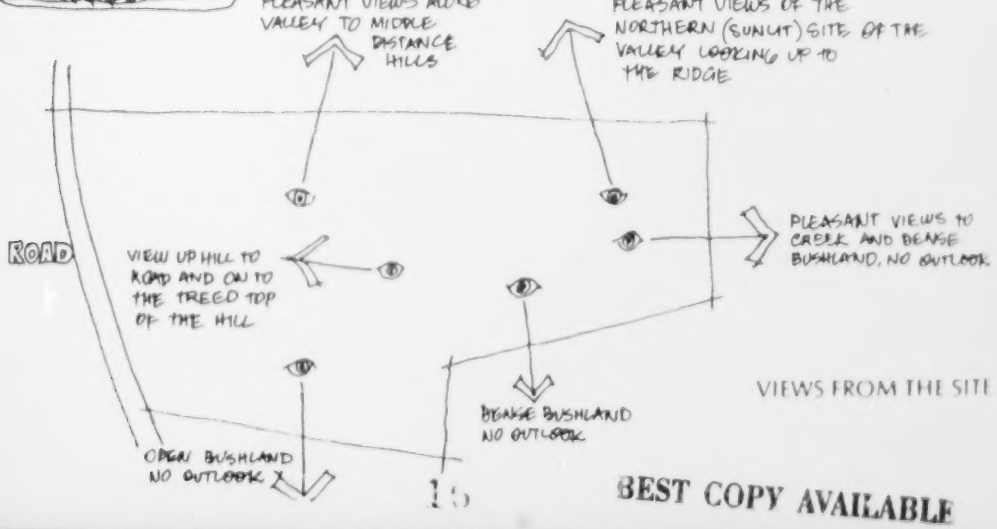
SLOPE ANALYSIS


ONLY POSSIBLE ACCESS POINT
STEEP BANK FROM ROAD MAKES ACCESS IMPOSSIBLE
STEEPER THAN 1:5
MODERATE 1:5 to 1:10
GENTLE 1:10 to 1:15

EXTERNAL VIEWS TO THE SITE


VIEWS DOWN THE VALLEY SITE HAS A BACKGROUND OF TREES. A BUILDING NEAR THE ROAD WOULD BREAK CONTINUITY OF THE GREEN RURAL VALLEY
FLEETING GLIMPSE OF THE SITE FROM THE ROAD
A BUILDING NEAR THE ROAD WOULD BLOCK VIEWS UP THE VALLEY
VIEW DOWN THE VALLEY FROM THE MAIN ROAD SITE HAS A BACKDROP OF BUSH A BUILDING NEAR THE ROAD WOULD BREAK THE CONTINUITY OF THE GREEN VALLEY


PLEASANT VIEWS ALONG VALLEY TO MIDDLE DISTANCE HILLS
PLEASANT VIEWS OF THE NORTHERN (SUNLIT) SITE OF THE VALLEY LOOKING UP TO THE RIDGE
ROAD
VIEW UP HILL TO ROAD AND ON TO THE TREED TOP OF THE HILL
PLEASANT VIEWS TO CREEK AND DENSE BUSHLAND, NO OUTLOOK
DENSE BUSHLAND NO OUTLOOK
OPEN BUSHLAND NO OUTLOOK

VIEWS FROM THE SITE

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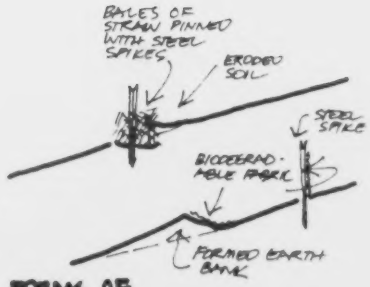
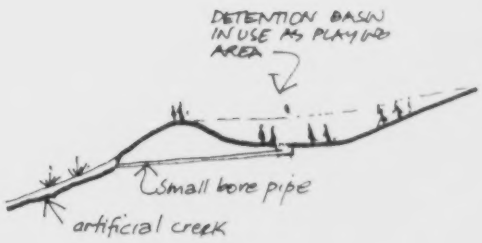


FORMS OF EROSION CONTROL



FLASH FLOOD CONTROL

Flash flooding control

The local council will have details of flooding potential and may already have in place a plan for handling large amounts of surface water.

Sometimes detention basins are required. These are depressions in the ground, usually grassed with outlet pipes sufficient only to allow a small quantity of water to discharge at a time. These are, in effect, temporary dams which remain dry for the majority of the time.

These areas can be useful to a school as a playing area. Billanook College in Mooroolbark, an outer suburb of Melbourne has doubled its area by locating the school adjacent to a detention basin. The area is maintained by the school in exchange for the use of the site for playing fields.

Some councils may require a school to discharge storm water to an on-site detention basin.

2.3.4. Potential for modifying contours

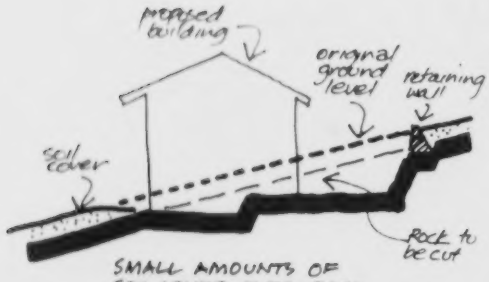
Schools require significant areas of open play space for a wide range of games, even if there is no intention to provide for formal game sites such as for netball and football.

For this reason, a site should have the potential to have the ground contours modified relatively cheaply, if required, by the process known as "cut and fill". Very steep sites do not permit this as retaining walls at the edges become too high.

Rock under surface, soil cover

Sites having excessive amounts of rock near the surface will require expensive excavation for services below the ground. A builder or excavation contractor should be asked to examine the amount of soil cover over rock. This can be done by excavating holes with a back-hoe in areas where the information is critical. This information is required for the following:

- design of foundations
- design of drainage systems
- the extent to which modifying contours is feasible



SMALL AMOUNTS OF SOIL COVER OVER ROCK CAN LEAD TO EXCESSIVE COSTS FOR EXCAVATION IN ROCK

Potential for slipping in certain soil conditions

Some sites are not useable because of a tendency for the soil to slip, particularly in wet weather. This condition is usually noted on council planning schemes. Characteristic of such land are sharply undulating and unusual contours.

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2.3.5. Landscaping potential - vegetation

In choosing a site, consider the potential for growing trees. Find out if the site has noxious weeds, hazardous vegetation or plants producing high levels of pollen that will have to be controlled.

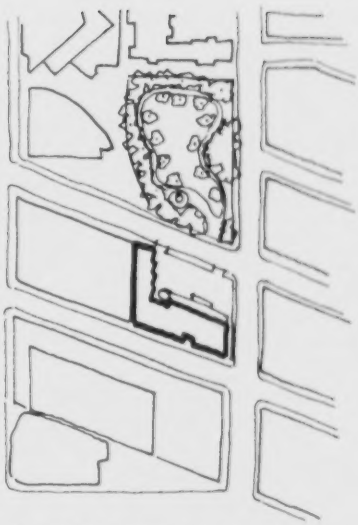
2.3.6. Limited Sites

A large number of new non-government schools commence operations on small or extremely limited sites (inner city or suburban). In these situations, a great deal of care in planning and design is required to provide the necessary buildings and to maximise limited land space for play and recreational purposes.

St Andrews Cathedral School in Sydney is a classic example of such a situation. The school occupies the top two levels of a multi-storey building in the inner city and the roof is a play space. It also occupies three levels of an adjacent building. The students are bussed to playing fields for sport.

Another alternative is to plan the school in a tightly restricted "envelope" where the enclosed spaces are clustered together, maximising the balance of the site for play and recreation.

This is exemplified by the first two stages of Pacific Hills Christian School, Dural, NSW built originally on a 7 acre site (3.13 hectares), part of which was already occupied by a house and a substantial dam which the local council required to be retained. The school at this stage was accommodated in a large single envelope with a gently sloping roof and roof lights to allow light and air into the inner parts of the building.



INNERCITY SCHOOL - WASHINGTON MARKET PARK Serves as extension of school playground.
NEW YORK CITY
Architects - RICHARD DATNER
Architectural Record March 1989.

Multiple storeys - advantages and disadvantages

The principle advantage of multiple storeys is to minimise the use of the site allowing maximum play/recreation areas.

The inclusion of an undercroft area for wet and hot weather protection as a play/lunch area and for limited physical education classes should be given careful consideration.

The disadvantages are many:

- high cost
- limitation on flexibility
- difficult to extend/ build as needs grow
- increase complexity in adhering to regulations
- travel between floors/classrooms is time consuming and expensive, particularly if mechanical means of vertical transport is required (lifts)

Usually, two storeys are the maximum desirable and acceptable before additional expense is incurred in complying with fire and safety regulations.

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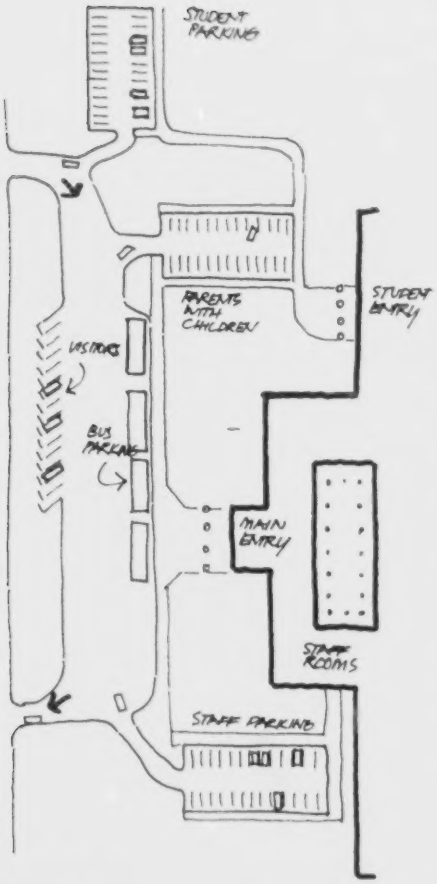


DIAGRAM ILLUSTRATING TRAFFIC-PEOPLE SEPARATION

2.4. Transport considerations

This section covers transportation considerations pertaining to:

- Safety aspects (2.4.1)
- Public transport (2.4.2)
- Private transport, parking and driver training areas (2.4.3)
- Service transport (2.4.4)

2.4.1. Safety Aspects

In selecting a suitable site careful analysis of the safety aspects for children should be made. As much as possible, student transport (particularly for younger students) routes on the school site should be separate from those established for staff, visitors and service vehicles.

Provision should be made for safe loading and unloading of children. Rising car ownership may mean that more children are being brought to school by their parents or are driving themselves to school, thus increasing the potential of serious traffic congestion at drop-off and pick-up times.

If a school is on a busy road there is a variety of traffic management schemes designed to reduce the risk of accident. They include special speed limits or speed reduction devices in the vicinity of the school entrances. Local councils should be approached to introduce such measures.

2.4.2. Public Transport

Proximity to transport routes or the likelihood of these developing once the school is established is an important factor in choosing a site. This should be evaluated prior to purchase. If there is no existing public transport service and none is planned, the alternative is to seek the cooperation of local bus companies in operating buses to the site. This is quite feasible provided the roads will tolerate the traffic. Negotiate as early as possible to determine the potential of such a service.

Bus shelters

Bus shelters are desirable. They can be simply established by attaching a canopy to a building or by covering areas along paths near pick-up points.

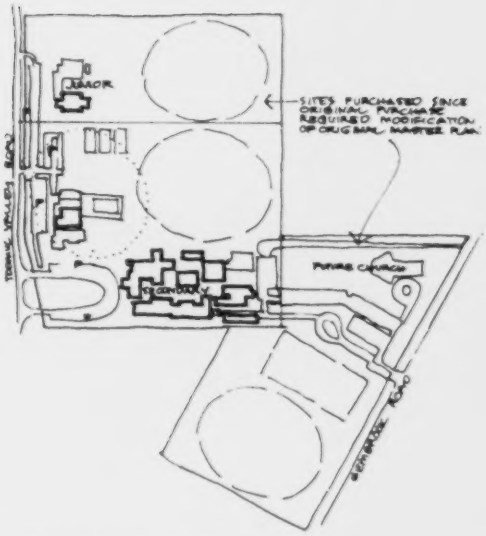
Congested parking areas

Ways of limiting crowding at school bus terminal and carparks include:

- adjusting the school timetable to allow sections of the school to emerge at different times

- having special buses take children to a community bus terminal where they may connect with other buses or meet parents
- the use of one-way traffic flow rules
- the sharing of road and parking facilities with compatible organisations nearby
- provision of drop-off and collection points for use by parents

At Beaconhills Christian College, Packenham Vic., the fortuitous purchase of an adjacent site to the south (for a related church with separate road access) and the expansion to the north for the junior school has provided several areas for car parking which helps to alleviate traffic at peak times.



Council requirements for bus parking/loading/unloading

Councils may require quite significant allocation of areas on site to cope with buses. Where the site is limited councils may permit the widening of the roadway adjacent to the school to provide for bus parking. This is appropriate only where there are suitable areas for buses to turn.

2.4.3. Private transport – parking and driver training areas

Staff parking

Adequate staff parking, sealed, preferably shaded and away from drop-off zones, needs to be provided. Unit paving such as brick or concrete pavers should be used if trees in the parking area have vigorous roots which may disturb continuous road paving such as bitumen.

Staff parking should be somewhat remote from the main entrance and isolated from student areas and preferably near the staff entrance.

UNIT PAVING UNDER TREES REDUCES IMPACT OF TREE ROOTS ON PAVING AND ASSIST GROWTH

Visitor parking

This needs to be adjacent to the public entrance, obvious and welcoming. Entrances, car parks and directions to the administration block should be clearly signposted.

Student parking

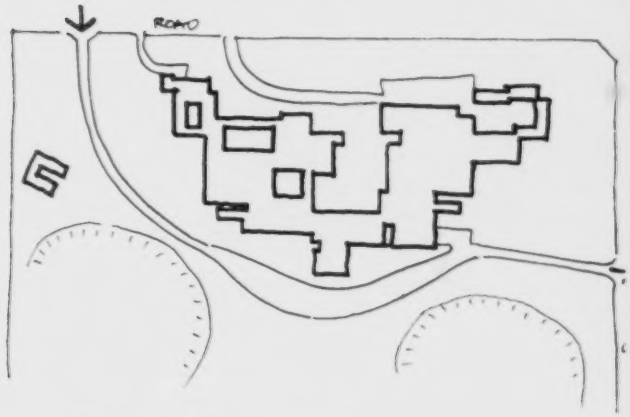
Increased senior secondary retention and mature-age students are making increased demands for parking. These areas should be located where they can be supervised and preferably remote from where younger children assemble.

Driver training areas

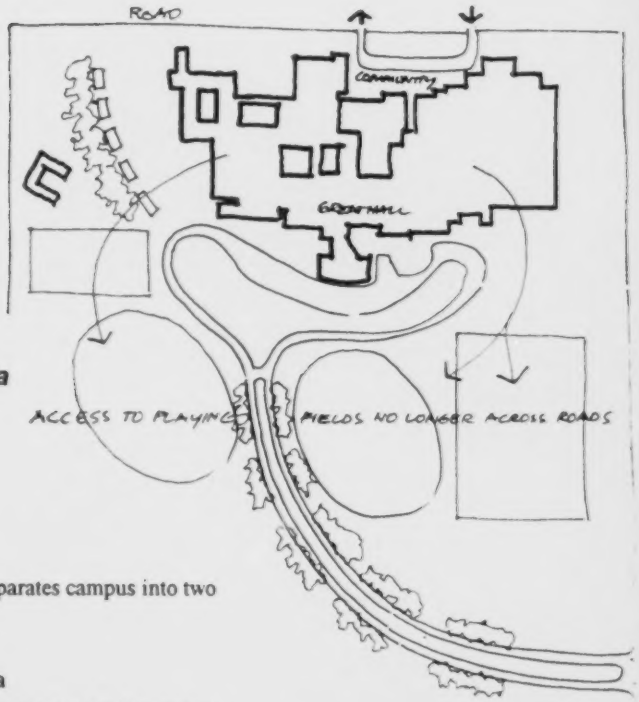
If a school master plan requires a fairly extensive road system, it could also be used for driver training and road safety education .

Use standard road signs within the site to designate as many of the typical road conditions as possible so that children on bicycles can also be trained in road safety.

REMOVABLE BOLLARD ALLOWS TRAFFIC WHEN REQUIRED.



EXISTING SCHOOL



NEW MASTER PLAN

Yarra Valley Anglican School, Victoria

Architects for new Master Plan –

Clarke, Hopkins & Clarke Architects

Existing School:

- prep to yr 10 boys only, yrs 11 and 12 co-ed
- one way road for cars, buses and deliveries separates campus into two halves and creates a safety hazard
- no definition/recognition of student zones
- administration centre is located in remote area
- maintenance facility provides and undesirable strong visual impact at main entry to school

New Master Plan

- fully co-educational school by 2004
- senior and junior playing areas separated
- development of four identifiable zones within the campus, i.e. primary/junior, secondary, senior secondary and community
- access to school via landscaped playing fields and impressive vista of Great Hall from approach road
- administration centre relocated into existing building adjacent to parking area.

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2.4.4. Service transport vehicles

Deliveries

There are several areas where deliveries need to made to a school, among them:

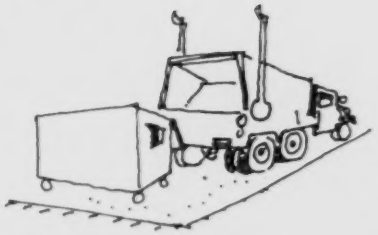
- canteen
- maintenance workshop
- science and technology areas
- administration and staff areas

Roads should be carefully planned in conjunction with the building plans to make service access convenient and, preferably, isolated from areas used by students.

If possible take account of changing levels to provide a dock to make the unloading of trucks into the building more convenient.

Refuse disposal

With concern for the environment requiring the sorting of refuse, several vehicles will need access to these areas regularly. Some of these vehicles will be quite large, using mechanical lifting equipment and therefore require plenty of room to manoeuvre.



ENSURE ROAD PAVEMENT IS ADEQUATE FOR HEAVY WHEEL LOADS.

Emergency - ambulance, rescue and fire

Ambulances and rescue vehicles need ready access to the sick room, to the playing fields and to other areas where accidents are likely to occur, such as technology areas.

Fire trucks need ready access to fire hydrants as well as access to most doors and walls. This need not necessarily be by road, but can be across playing fields provided ground conditions are sufficiently stable and capable of bearing the wheel loads.

In rural environments access to fire trails is desirable through school property and to the perimeter of the property via cleared areas to provide easier access to fires which are threatening the school.

2.5. Recreation facilities

Students need recreation and lunch areas that are shaded and preferably near classrooms to enable effective supervision and use during class time.

Primary

Primary students require large playgrounds as well as small areas for fixed equipment designed to help them develop muscle coordination.

Secondary

Secondary students need sports grounds (see 2.5.3 below) as well as areas for relaxing and socialising.

Generally, secondary level sporting areas should be quite distinct from primary level areas for safety reasons. Some mixing of senior

and junior student areas may be appropriate if compatible with the school's ethos and student preferences.

2.5.1. Passive recreation

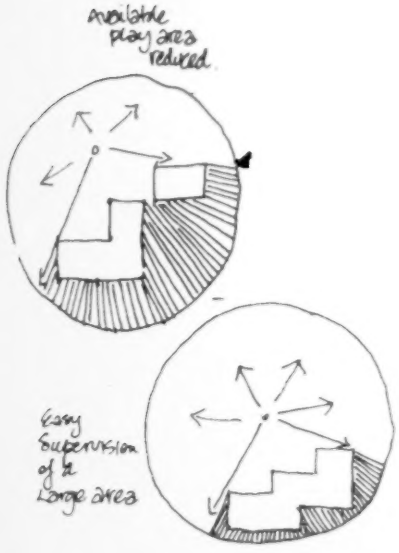
Passive recreation areas include:

- intimate courtyards with seating where effective supervision can be maintained
- shaded areas
- gardens with flowers, plants used in biology, and native shrubs to encourage birds
- animal enclosures where agriculture is studied

2.5.2. Active Recreation

Active recreation in schools includes:

- formal games areas, hockey, football, cricket, netball, basketball, tennis courts. Some of these activities can be indoors (multi-purpose hall)
- swimming pools
- large expansive areas for unstructured play
- climbing equipment (moving equipment like roundabouts and swings are usually inappropriate in schools)
- gymnasium
- practice areas for specific sports



LOCATION OF ELEMENTS ON A SITE AFFECTS THE AVAILABLE, SUPERVISABLE PLAY AREA.

2.5.3. After hours use

When choosing a site, the after-hours use of sporting facilities should be a consideration. The use of lighting and the potential impact on neighbours should be considered and planned for in the very early stages.

2.6. Site facilities and services

2.6.1. Paths and roads

As a general principle, the road network should be kept to the perimeter of the school with the footpath system being internal and quite separate from the road network. In certain cases paths may need to follow roads.

The paths should follow logical arrangements – be where people want to and need to walk. If a track across a landscaped area develops, it is a sign that paths have not been well planned. To block access to "tracks" with artificial barriers "misses the point" and creates an unnatural landscape tension.

A suitable and safe distance must exist between all exits and roadways. Exits which open directly on to roadways are a hazard to both pedestrians and vehicles. Plan to have a length of path between doors and roads.

2.6.2. Site Services

Stormwater drainage systems and disposal

The system should be designed with the maximum development potential in mind, to avoid having to replace pipes at a later stage.

Disposal can be:

- on site (if site is large)
- via street drainage system
- adjacent creek/river
- across ground (design to avoid scouring and erosion)
- on site storage – dam, used for irrigation

Power reticulation, substations, emergency access

Design with maximum potential in mind. Locate main supply cables and conduits in readily accessible areas for emergency replacement and access in case of fire.

It is good economic sense to lay additional conduits alongside those required in the first instance to take the additional cables for future developments.

Substations are sometimes required to be located on the school site for which the supply authority will usually require a lease for a nominal amount.

Sewage disposal

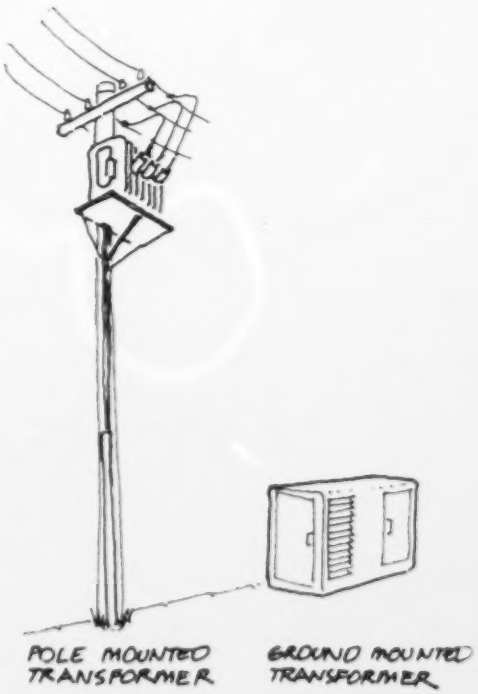
The school can dispose of sewage using a municipal or on-site system. For details see section 3.8.2.

Communication systems for support staff

In planning the site services it is important at the earliest possible stage to establish an efficient communication system throughout the school. It will be used initially during the construction of the school and later, for example, to locate support staff in emergencies and for deliveries. The system may comprise:

- induction cable and receiver
- mobile phone
- two-way radio
- pager
- public address system

A public address system, if installed, should be used only for emergencies and other special purposes, as it interferes with classes when used during teaching periods. Furthermore the noise levels generated are often a concern with neighbours. If a public address system is required, plan for it to be directed if possible away from neighbours properties.



Site lighting for security

Plan for a well-lit school site after hours, preferably for the entire night. This will involve reticulating power throughout the site as well as providing adequate lighting controls. Lights activated by movement detectors are useful as they provide light only when needed and thus save power.

Site security

Site security is best provided by:

- a human presence on site – staff accommodation or janitor
- surveillance by security companies
- security patrol – irregular so it can't be anticipated

Consider how surveillance can be readily accomplished by a caretaker, camera or patrol. Minimise areas where intruders can hide, particularly near entrances. Ensure entrances are well lit.

A restriction on vehicles moving into the site after hours provides an effective deterrent to theft, as stolen material must be carried to the perimeter of the site. These measures, however, will not stop vandalism.

Depending on the security levels desired perimeter fences may be either 1.2-metre-high chain wire or in areas of extreme cases of vandalism 1.8 metres high with barbed or sabre wire at the top.

2.6.3. Fire control

In selecting and managing a school site the maintenance of an environment safe from fire is a high priority.

Natural fire breaks

Keep bush clear of buildings by a margin recommended by the local fire brigade. This margin will vary according to the degree of risk and the terrain.

Hydrant systems

Fire hydrants are large stand pipes to which the fire brigade can connect their hoses and/or their own fire pumps in order to provide sufficient water to fight a fire. For more detail refer to section 3.8.6.

Hose reels

Hose reels are fire hoses suitable for use by untrained personnel. Along with fire extinguishers they are the first line of defence. For further detail refer to section 3.8.6.